

Wireless Interface Options for 1451

Presented at the
Wireless Sensing Workshop
Sensors Expo /2001
June 4, 2001

Michael R. Moore
Oak Ridge National Laboratory

Key Elements of Sensor Standard

- TEDS
- Synchronization of Data Sampling
- Unique Identification
- Accessibility to Networks (e.g. Internet)
- Plug-and-Play Sensor Connections

Business And Technology Issues Drive Selection

- Business/Marketing

- Industry Acceptance
 - » Cost
 - » Availability
 - » Reputation
 - » Form and Function
- Standards Development
 - » Leverage Current Standards
 - » Buy-in From Membership
- Future Growth

- Technology

- Bandwidth
- Power requirements
- Compatibility
 - » System Integration
 - » RF Interference
- # of Nodes
- Size/Length of Network
- Extensible for Future Growth

Candidate 1451 MAC/PHY

From Other Wireless Standards

(Business Issues)

- Use IEEE 802 Family As a Model
 - Get Market Acceptance of Protocol
 - Let MAC/PHY Adapt to the Market Place
- Time to Market
 - Which MAC/PHY Are Supported by Current ASICs
 - Which Existing Standardized PHY is the Closest to **Meet** Our Needs
- Cost

Candidate 1451 MAC/PHY

From Other Wireless Standards

(Technology Issues)

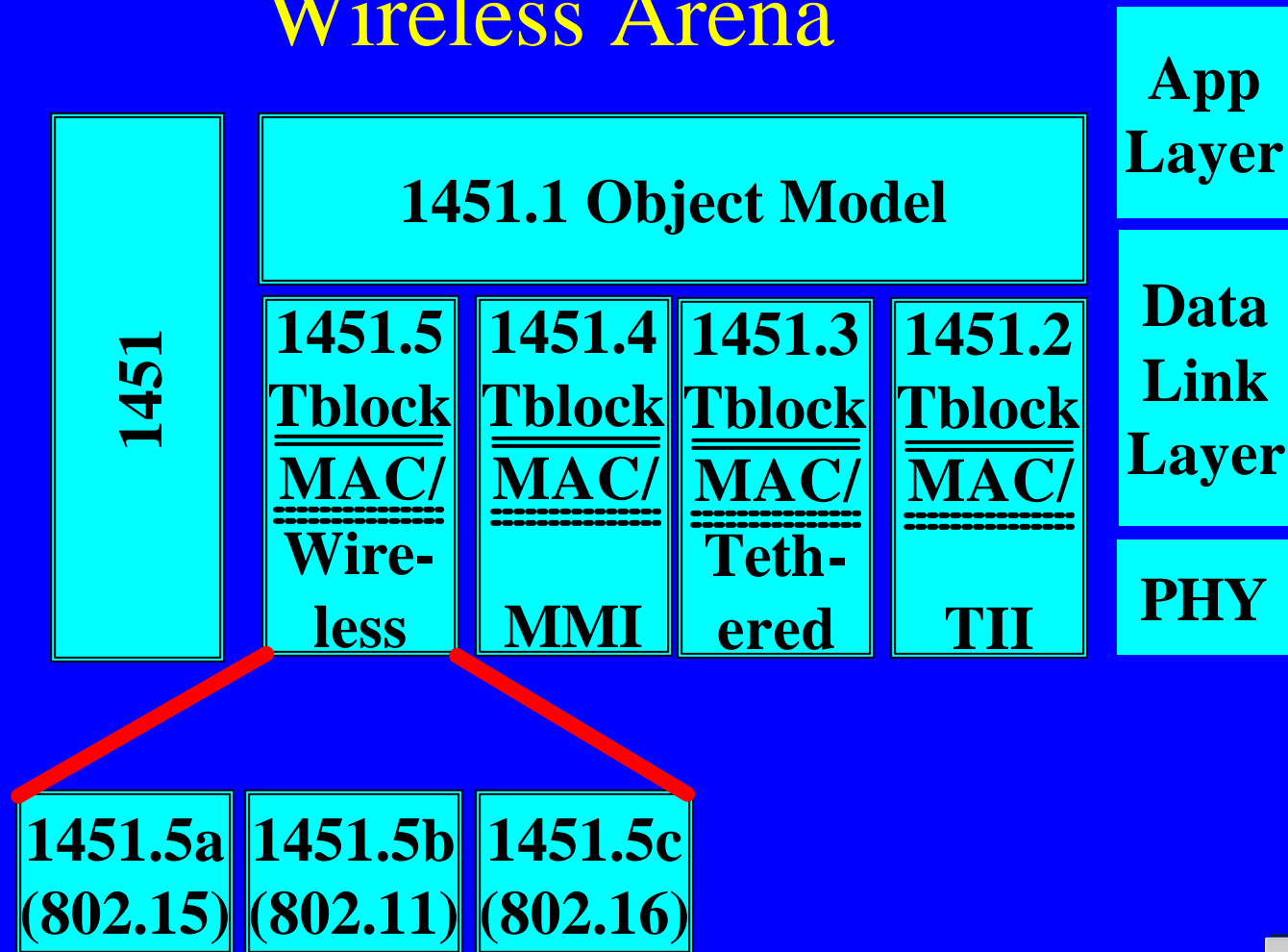
Std	OFDM	FHSS	DSSS	GHz	Size	Mbps
IS-95			x	1 +/-	Cell	0.x
Bluetooth		x		2.45	PAN	1
P802.15		x		2.45	PAN	1
P802.16b	x			5	WAN	54
802.11a	x			5	LAN	54
802.11		x	x	2.45	LAN	1, 2
802.11b			x	2.45	LAN	5.5, 11

IEEE 802 Wireless Projects

- IEEE 802.15 (Bluetooth)
- IEEE 802.11
 - » Clause 14 - 1,2 Mbps FHSS LAN MAC for 2.4 GHz
 - » Clause 15 - 1,2 Mbps DSSS LAN for 2.4 GHz
- IEEE 802.11a
 - » Adds Clause 17 - ≤ 54 Mbps OFDM LAN for 5 GHz
- IEEE 802.11b
 - » Adds Clause 18 - 5.5 and 11 Mbps DSSS for 2.4 GHz
- IEEE 802.16b (task group 4) Wireless High-Speed Unlicensed Metropolitan Area Network (Wireless HUMAN)
 - » MAC: IEEE 802.16
 - » PHY: IEEE 802.11a; ETSI BRAN HIPERLAN/2

IEEE P1451.5

Could Accommodate Rapidly Changing
Wireless Arena

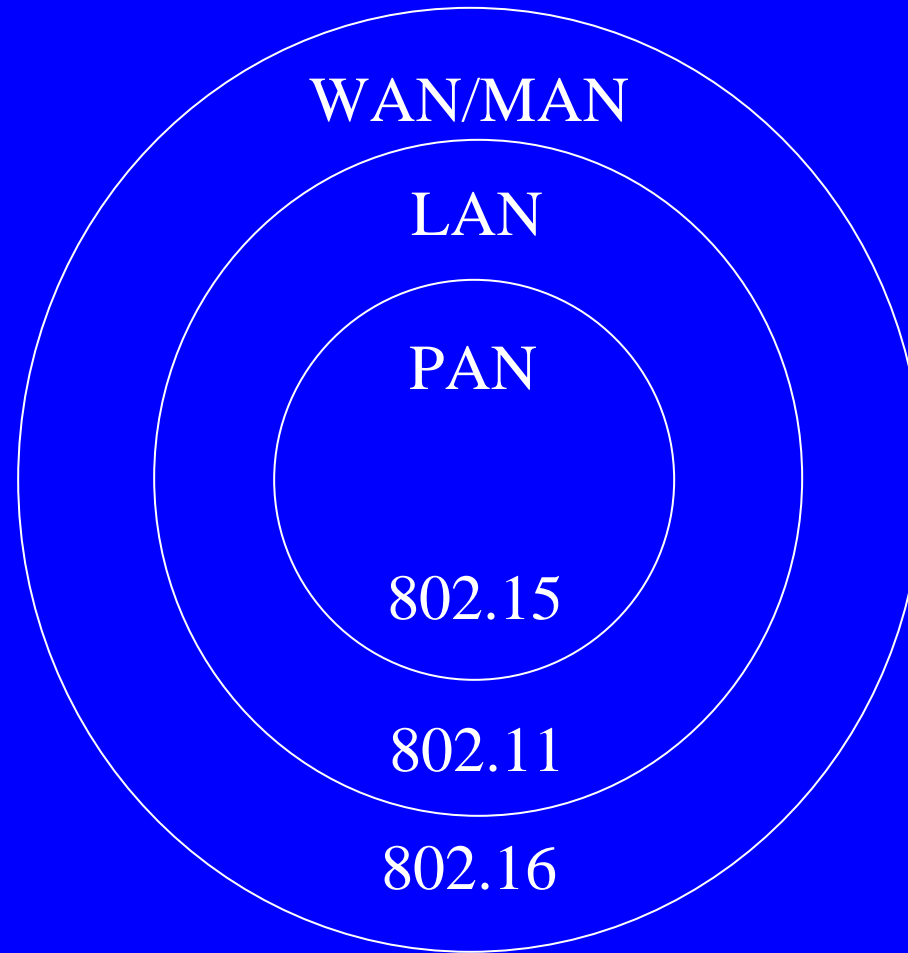


1451.5 Wireless

Leverages Other 1451 Projects

- Smart Transducer Object Model from 1451.1
- TEDS Concept from 1451.2
- Synch and XML TEDS from P1451.3
- Compact TEDS and Transducer Interface from P1451.4

Size of Network vs PHY



Future Growth

- A Well-Planned Architecture Enables the Quick Incorporation of...
 - Emerging Wireless Technologies
 - Security (as described in IEEE 1363)
 - Mobile Ad-Hoc Networking
 - Others

Conclusion

- A new Wireless Interface, IEEE P1451.5, is Proposed that will
 - Leverage Sensor Networking Capabilities From the Other IEEE 1451 Projects
 - Include Multiple MAC/PHY Combinations
 - Use IEEE 802 Approach as a Model
 - Has a Layered Architecture
 - » Enables Rapid Ramp-Up Utilizing Existing Products
 - » Enables Future Growth